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US 5567041 A US 5548499 A US 5440471 A
US 5373431 A US 4930054 A

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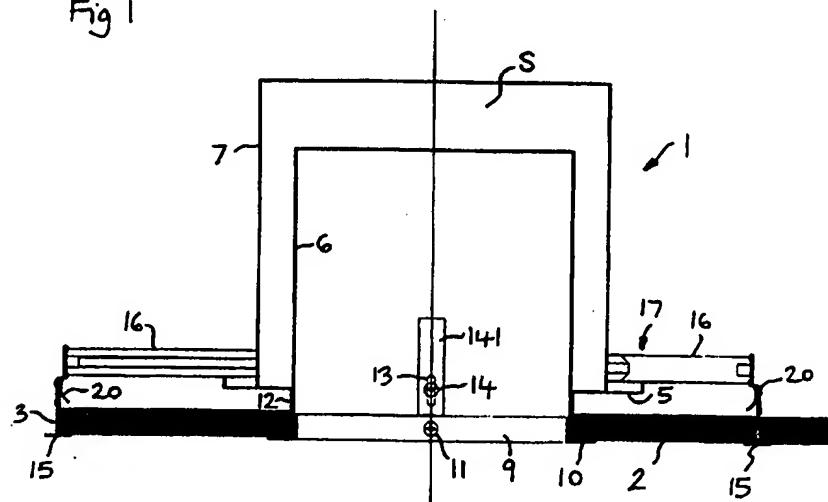
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United Kingdom

(54) Abstract Title

LUMINAIRE FOR CEILING LAMP

(57) A luminaire (1) adapted to be mounted in the ceiling void of a ceiling so as to project light through an opening formed in the ceiling, comprises a steel frame (5), a steel inner can (6) adjustably mounted onto the frame which supports a lamp holder (8) and has an open end adapted to fit in the ceiling opening, and a steel outer can (7) mounted on the frame to substantially surround the inner can to define a substantially closed space therebetween. A steel gasket ring (9) which fits into the open end of the inner can (6) and has a radial flange (10) which bears against the ceiling surface surrounding the ceiling opening.

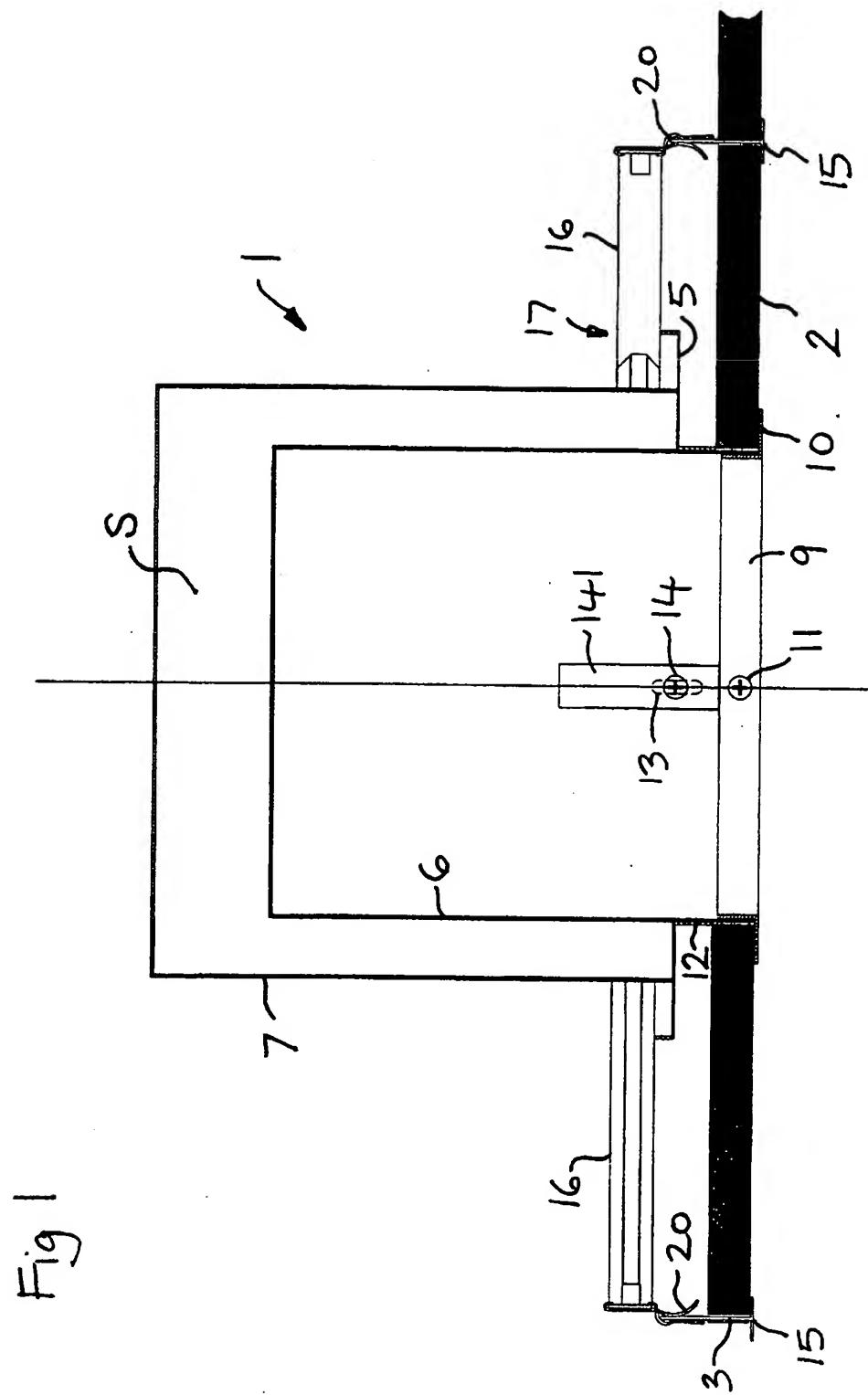
Fig 1



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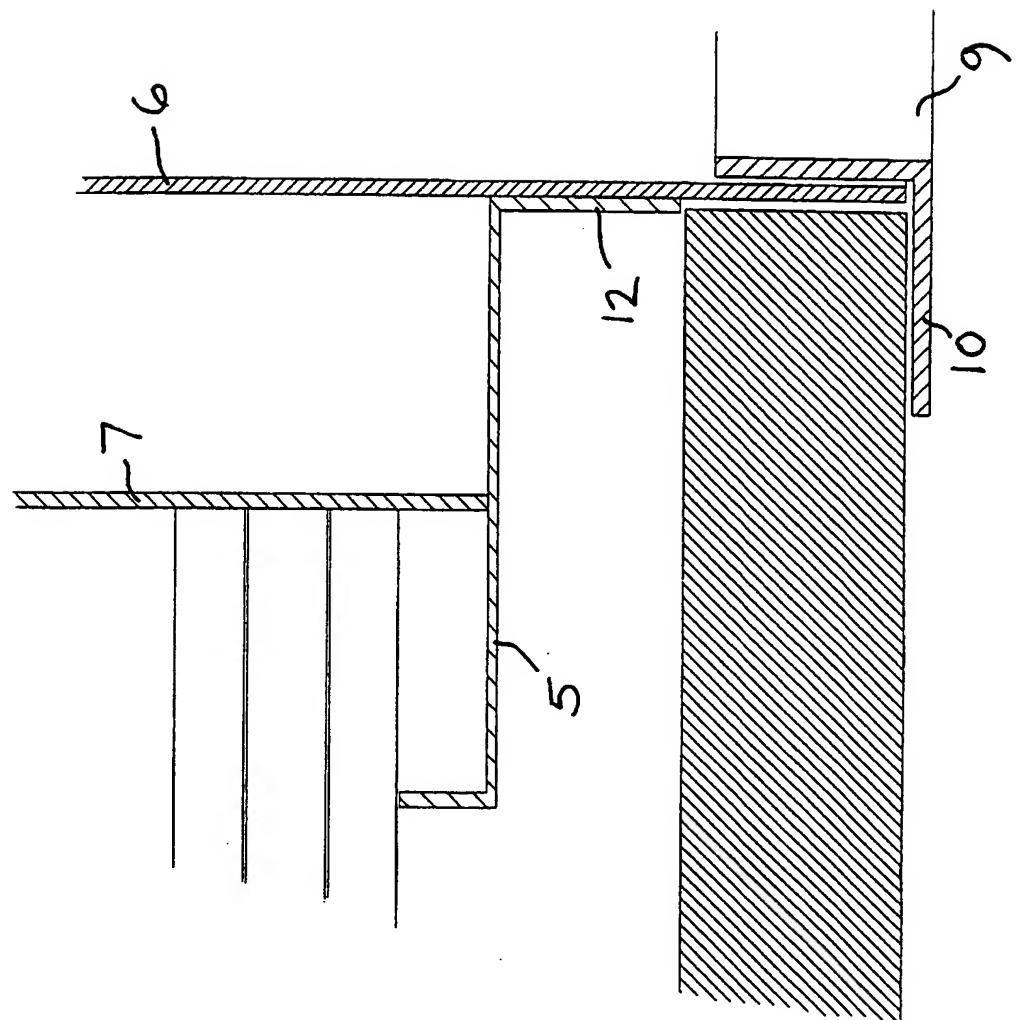


Fig 2

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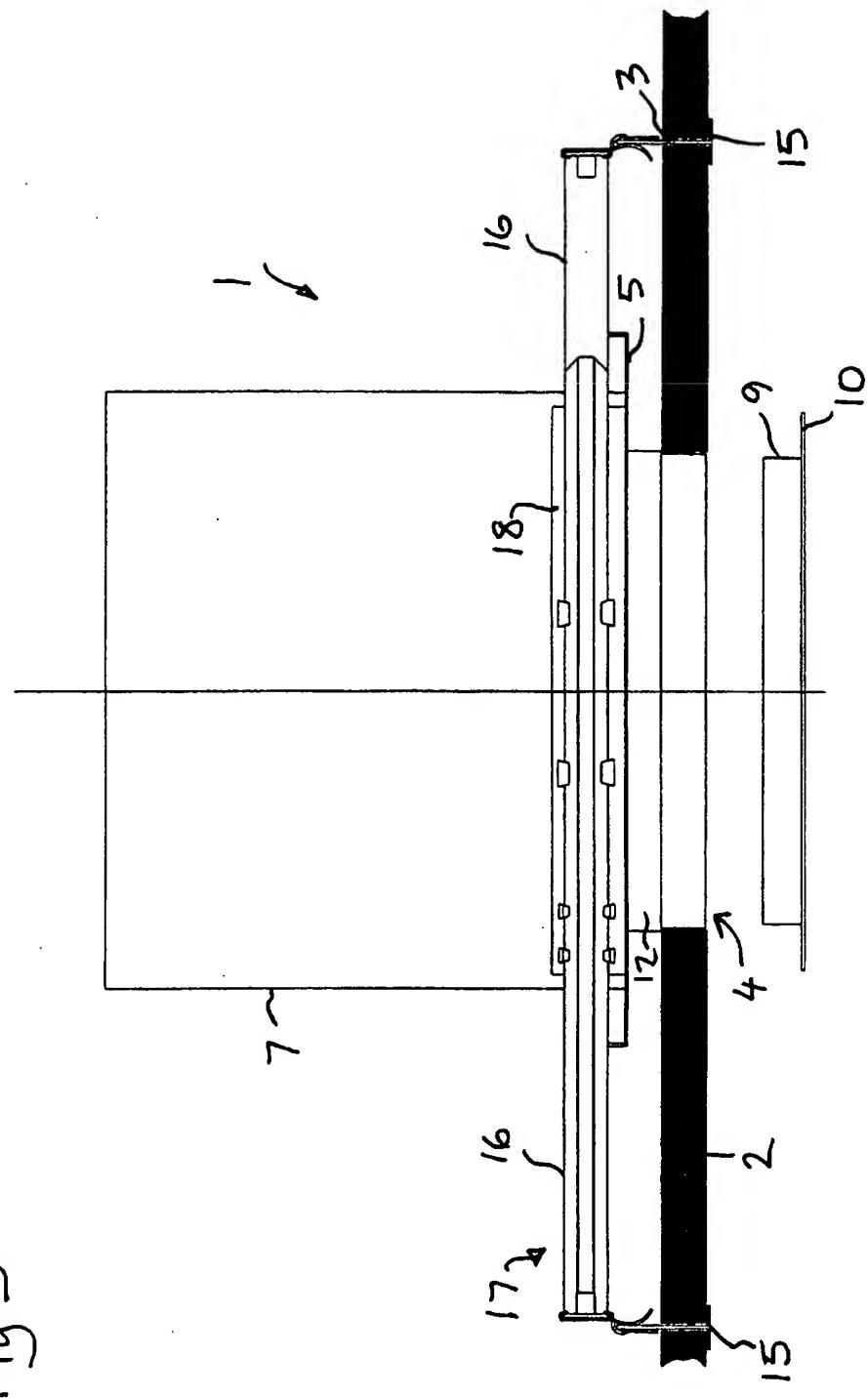


Fig 3

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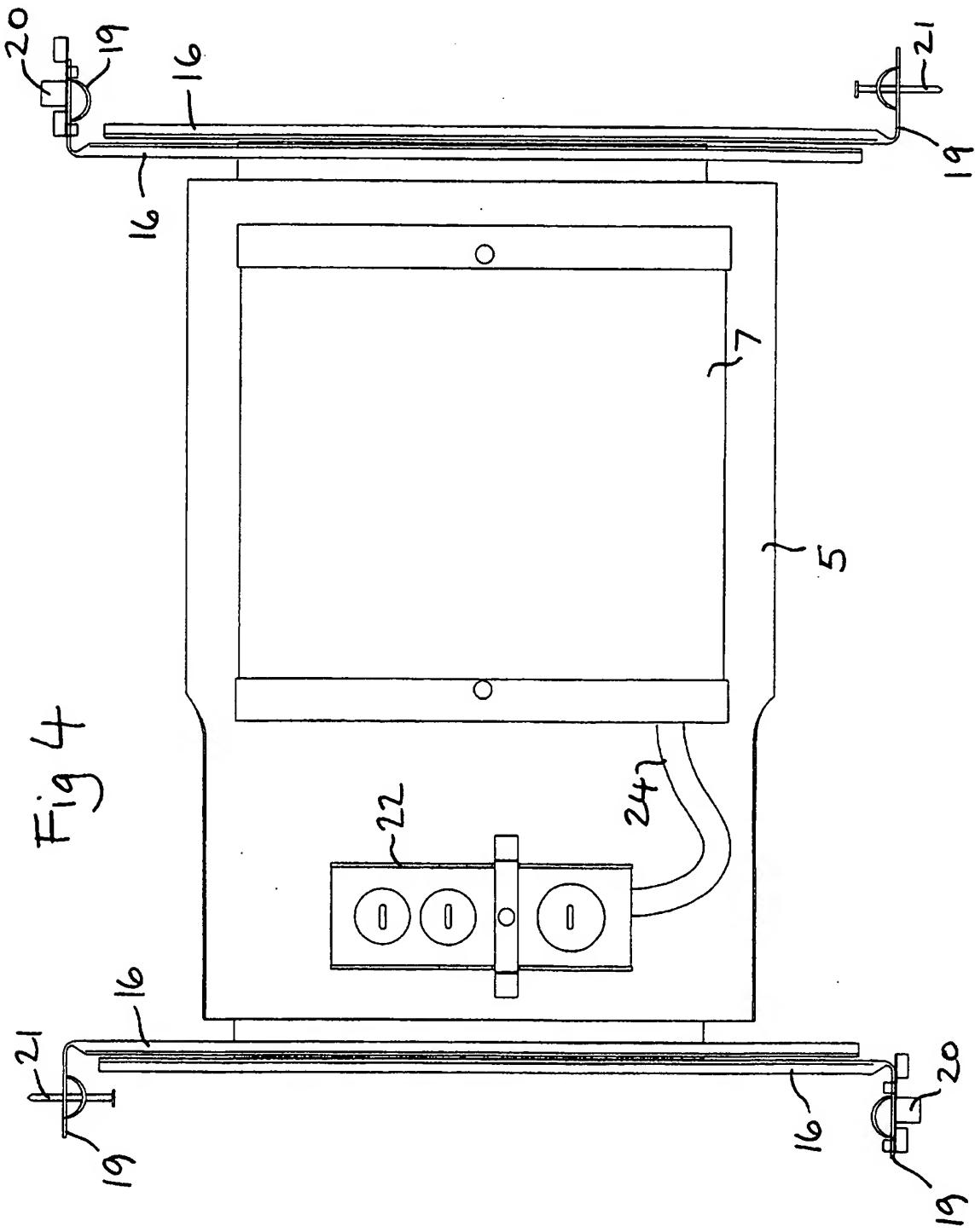
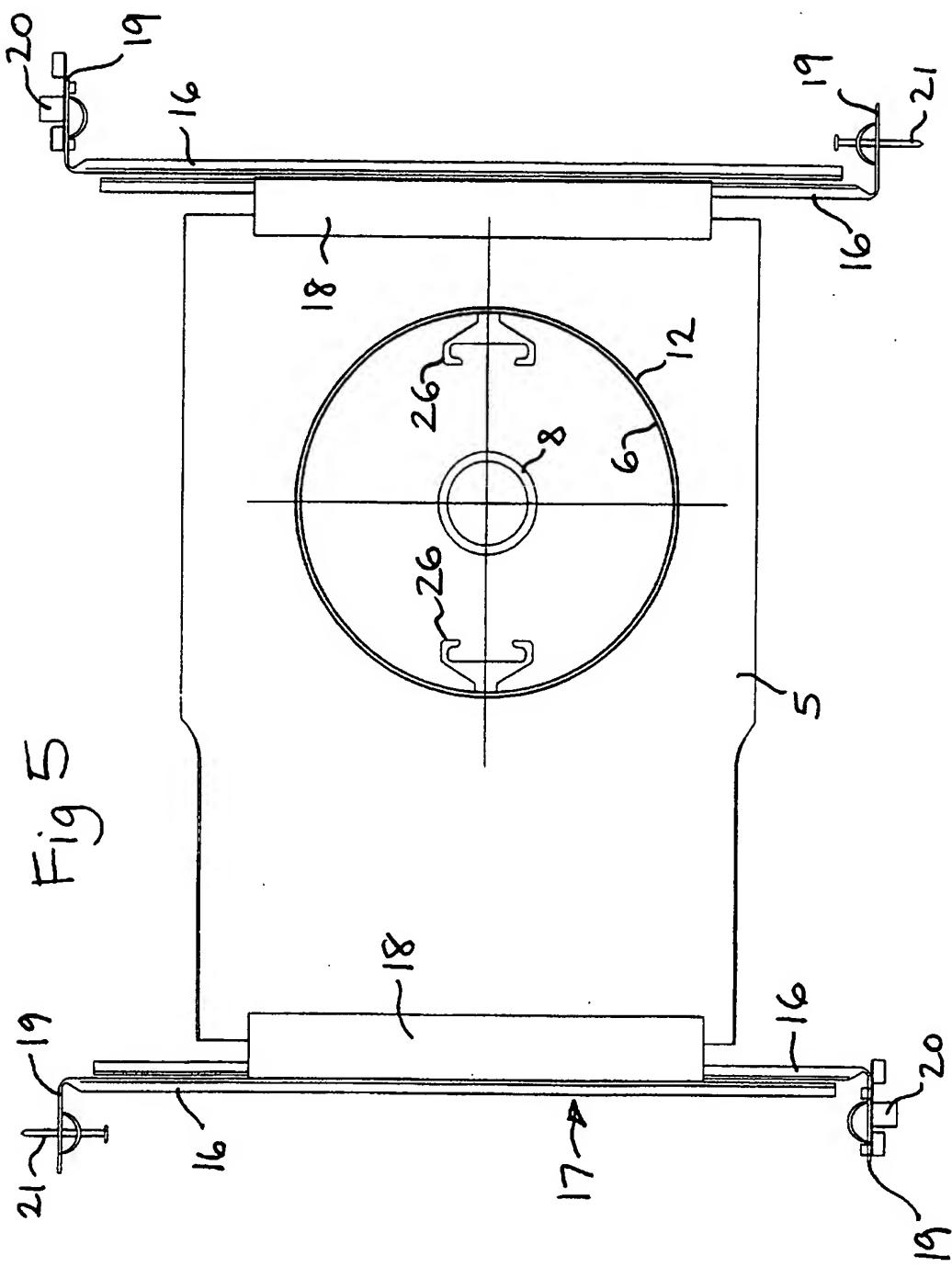


Fig 4

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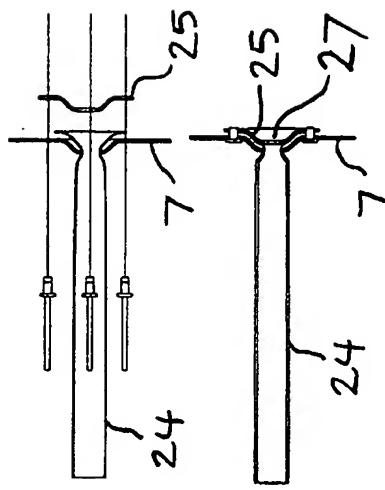


Fig 8

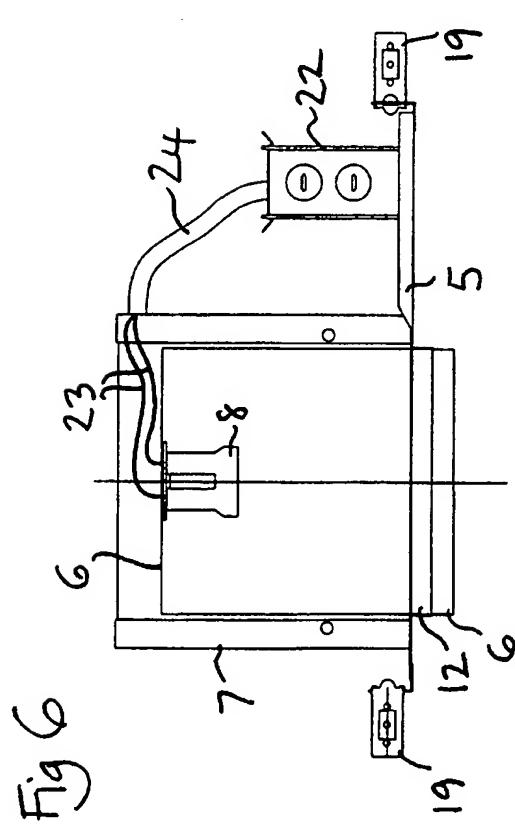
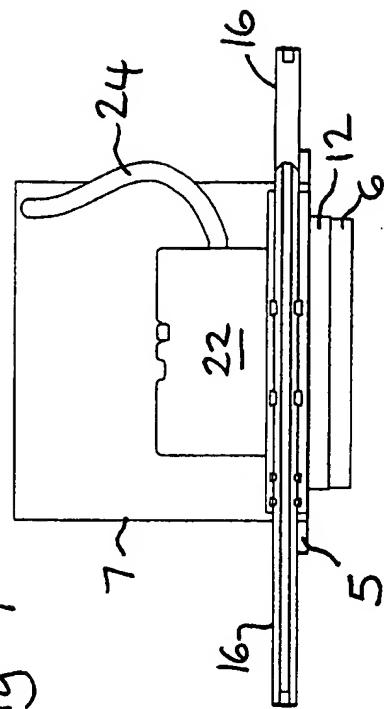


Fig 7



LUMINAIRES

The invention relates to luminaires adapted to be mounted in the ceiling void of a ceiling supported by a ceiling frame so as to project light through an opening 5 formed in the ceiling. The ceiling frame will normally be in the form of parallel joists in the case of a plasterboard ceiling or, in the case of a suspended ceiling, a reticulation of T-bars.

Such void mounted luminaires are normally 10 supported on the tiles or boards of the ceiling rather than on the support frame of the ceiling. They are usually mounted by being passed through the hole cut in the ceiling and held in place by spring clips. In the case of a fire in the room below the ceiling, flames pass 15 through the hole and into the luminaire. The luminaire may be of open construction allowing the flames to pass into the ceiling void. The heat from the fire will also cause the spring clips to collapse so that the luminaire can fall out of the ceiling. In these conditions, the 20 ceiling will soon collapse and provides little resistance to the spread of fire.

The object of the present invention is to delay the collapse of a fire-rated ceiling in the event of a fire, by preventing the spread of fire through the opening 25 in the ceiling.

Accordingly the present invention provides a

luminaire adapted to be mounted in the ceiling void of a
ceiling supported by a ceiling frame so as to project
light through an opening formed in the ceiling,
comprising: a frame; a steel inner can mounted on the
5 frame and supporting a lamp holder and having an open end
adapted to fit in the ceiling opening, the inner can being
closed apart from its open end; a substantially closed
steel outer can mounted to substantially surround the
inner can with spacing therebetween; a steel gasket ring
10 adapted to fit into the open end of the inner can and to
be fixed thereto and having a radial flange adapted to
bear against the ceiling surface surrounding the ceiling
opening; means for mounting the inner can adjustably on
the frame; and means for mounting the luminaire to the
15 support frame of the ceiling to be supported thereon.

A "fire seal" between the flange of the steel
gasket ring and the ceiling prevents fire from passing
through the ceiling opening on the outside of the inner
can. Because the gasket ring sits inside the inner can
20 and the inner can is closed apart from its open end, fire
cannot pass through the inner can to the ceiling void.
This creates a barrier to the flames, reduces the amount
of heat that can pass into the ceiling void through the
cut-out hole and also helps to support the ceiling itself.
25 The inner can and the front gasket ring can be adjusted to
accommodate varying thicknesses of ceiling ensuring the

'fire seal' is maintained.

The double skinned twin steel can construction which is provided by having one can within another further prevents heat getting into the ceiling void through the fitting. The closed space between the two cans is substantially sealed and the air trapped between the two cans acts as an insulator in the same way as double glazing. The cans can be manufactured in a range of different sizes to allow different lamps to be used.

Both the inner and outer cans (as well as other parts of the luminaire) are preferably manufactured from 20 SWG (1.0mm) steel and are riveted and screwed securely together to ensure that no flames can pass through the luminaire. The material and method of construction ensure that the luminaire does not deform or distort when exposed to the heat of a fire.

The construction of the preferred embodiment provides several other energy saving benefits. Drafts are eliminated, sound transmission is reduced and heating and cooling losses are minimised.

An embodiment of the invention is described below, with reference to the accompanying drawings, in which:

Figure 1 is a vertical cross section of a luminaire mounted above a suspended ceiling;

Figure 2 is an enlarged portion of Figure 1;

Figure 3 is a side view of the luminaire with the ceiling shown in section;

Figure 4 is a plan view of the luminaire;

Figure 5 is an underplan view of the luminaire;

5 Figure 6 is a diagrammatic part-sectional view of the luminaire on a smaller scale showing the electrical wiring;

Figure 7 is a side view corresponding to Figure 6; and

10 Figure 8 is a detailed view showing how the fire proof sleeve of the electrical wiring is connected to the outer can.

The luminaire shown in the accompanying drawings is made substantially from 20 SWG (1.0mm) steel formed to 15 provide a double-skinned housing which creates a barrier to flames and reduces the amount of heat that can pass into the ceiling void through the cut hole in the event of a fire and also helps to support the ceiling.

In Figures 1-3, the luminaire 1 is shown mounted 20 in the ceiling void of a ceiling 2 which is supported by a ceiling frame 3. The luminaire projects light through an opening 4 formed in the ceiling by a cut hole.

The luminaire has a steel frame in the form of a generally flat sheet. The frame supports an inner steel 25 can 6 and an outer steel can 7 which is mounted on the frame to substantially surround the inner can but with a

spacing therebetween. The inner can 6 is formed by a spinning operation and is cylindrical with its open end adapted to fit in the opening in the ceiling. At its other end the inner can supports a lamp holder 8. The
5 inner can is closed apart from its open end. The outer can is formed as a rectangular box from steel sheet riveted together and screwed to the frame 5 to surround the inner can with a substantially sealed air space therebetween. The closed air space S may not be
10 hermetically sealed but there are no significant openings for the passage of air into or out of the air space.

As can be seen best in Figure 2, an annular gasket ring 9 fits closely into the open end of the inner can and has a radial flange 10 which bears against the
15 undersurface of the ceiling 2 surrounding the ceiling opening 4. The ring 9 is fixed tightly into the open end of the inner can 6 by three circumferentially spaced screws 11 of which only one is shown in Figure 1. The inner can is mounted for limited axial adjustment on a
20 cylindrical flange 12 formed on the frame. For this purpose the lower part of the inner can is formed with three circumferentially spaced slots 13 of which only one is shown in Figure 1. Screws 14 pass through these slots and through tabs (not shown) raised out of the flat sheet
25 of the frame 5 at three points around the flange 12 and forming upper extensions thereof. Steel covering plates

141 are placed over the slots 13 to ensure that a substantially air-tight seal is maintained to prevent the passage of air into the closed space S between the inner and outer cans.

5 The ceiling shown in Figures 1-3 is of the suspended type where square ceiling tiles are supported by a support frame in the form of a reticulation of T-bars
15. The T-bars are suspended on wires (not shown).

In order to mount the luminaire onto the support
10 frame of the ceiling rather than on the ceiling itself (ie the tiles), the luminaire is provided with two pairs of elongate sliding support struts 16 located on opposite sides of the frame. Each pair of struts provides a mounting rod 17 of adjustable length with the two such
15 rods being parallel to one another. The struts are slidingly supported on the frame by means of brackets 18 and are formed at their free ends with feet 19. As shown in Figures 1-3 these feet carry clips 20 which are used to attach the feet 19 to the T-bars of the ceiling support
20 frame. Where applicable, the clips 21 are designed to allow for any movement of the ceiling frame as it buckles or twists under the heat of a fire. This ensures that the integrity of the fire rated ceiling is maintained. In the case where the ceiling support frame is in the form of
25 joists, the clips 20 are dispensed with and the feet are fixed to the joists by nails 21. Two of the feet 19 in

each of Figures 4 and 5 are shown provided with nails 21 but it should be understood that, in practice, the feet will all be provided either with clips 20 or with nails 21. By either arrangement, the weight of the luminaire 5 rests on the ceiling frame rather than the ceiling itself.

Also mounted on the frame 5 outside the outer can 7 is a junction box 22 for electrical connection to a power supply. Electrical wiring 23 for the luminaire passes from the junction box through the outer can 7 to 10 the lamp holder. The wiring must, of course, pass through holes in the inner can to reach the lamp holder. These holes are sealed off by the lamp holder, however. Between the junction box 22 and the outer can 7, the wiring is covered by a silicone saturated glass-fibre fire-proof 15 sleeve 24. The sleeve and wiring both enter the outer can 7 and the sleeve is then uniformly splayed out and secured to the inside of the outer can 7 by a riveted fixing plate 25. This fixing arrangement is shown in Figure 8.

The plate 25 clamps the splayed end of the 20 sleeve to the outer can and thereby helps to maintain the fire seal properties of the luminaire. The aperture, through which the wiring 23 passes into the outer can 7 is of such a size that it is occluded by the wires to maintain a seal. As a result of this, the space between 25 the inner and outer cans remains substantially sealed.

To install the luminaire, a circular opening is

CLAIMS

1. A luminaire adapted to be mounted in the ceiling void of a ceiling supported by a ceiling frame so as to project light through an opening formed in the ceiling,
5 comprising:
 - a frame;
 - a steel inner can mounted on the frame and supporting a lamp holder and having an open end adapted to fit in the ceiling opening, the inner can being closed
10 apart from its open end;
 - a substantially closed steel outer can mounted to substantially surround the inner can with spacing therebetween;
 - a steel gasket ring adapted to fit into the open
15 end of the inner can and being fixed thereto and having a radial flange adapted to bear against the ceiling surface surrounding the ceiling opening;
 - means for mounting the inner can adjustably on the frame;
- 20 and means for mounting the luminaire to the support frame of the ceiling to be supported thereon.
2. A luminaire as claimed in Claim 1, wherein the inner can is cylindrical and is mounted axially adjustable on the frame within a cylindrical flange formed on the
25 frame.
3. A luminaire as claimed in any preceding claim,



The
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Office

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Application No: GB 9800072.2
Claims searched: 1-8

Examiner: Jason Scott
Date of search: 13 March 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

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Int Cl (Ed.6): F21S (1/02, 3/02); F21V (21/04, 25/00, 25/12, 31/02)

Other: ONLINE: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
A	US 5567041	SLOCUM	
A	US 5548499	ZADEH	
A	US 5440471	ZADEH	
A	US 5373431	HAYMAN	
A	US 4930054	KREBS	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.